USER MANUAL

BM 25A

Part Number: NP25AEN
Version: B

OLDHAM

The Fixed Gas Detection People

GAS DETECTION

We are delighted that you have chosen an **OLDHAM** instrument and would like to thank you for your choice.

We have taken all the necessary measures to ensure that your instrument provides total satisfaction.

Now it is important to read this document carefully.

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GUARANTEE

***** 2 years guarantee in normal conditions of use on parts and labour, return in our workshops, excluding consumables (sensors, filters, etc.).

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WARNINGS AND CAUTIONARY STATEMENTS

IMPORTANT: Failure to perform certain procedures or note certain conditions may impair the performance of this product. For maximum safety and optimal performance, please read and follow the procedures and conditions listed below.

IMPORTANT: Read and understand this manual before operating.

WARNING: SERVICING THE UNIT OR CHANGING THE BATTERIES MUST ONLY BE DONE IN AN AREA KNOWN TO BE NONHAZARDOUS.

Prior to each day's use, a bump test should be performed. If the instrument does not pass the bump test, a full calibration is recommended.

Oxygen deficient atmospheres may cause combustible gas readings to be lower than actual concentrations.

Oxygen enriched atmospheres may cause combustible gas readings to be higher than actual concentrations.

Verify the calibration of the combustible gas sensor after any incident where the combustible gas content has caused the instrument to display an over-range condition.

Silicone compound vapors or other known contaminants may affect the combustible gas sensor and cause readings of combustible gas to be lower than actual gas concentrations. If the instrument has been used in an area where silicone vapors were present, always calibrate the instrument before next use to ensure accurate measurements.

Sensor openings and water barriers must be kept clean. Obstruction of the sensor openings and/or contamination of the water barriers may cause readings to be lower than actual gas concentrations.

When in the hazardous area, connections to the battery charging or communications ports must be done in accordance with this technical manual.

WARNING: Substitution of components may impair intrinsic safety and may cause an unsafe condition.

CAUTION: For safety reasons, this equipment must be operated and serviced by qualified personnel only. Read and understand the instruction manual completely before operating or servicing.

CAUTION: High off-scale readings may indicate explosive concentration.

CAUTION: Any rapid up-scale reading followed by a declining or erratic readingmay indicate a gas concentration beyond the upper scale limit which may be hazardous.

CAUTION: Before each day's usage, sensitivity must be tested on a known concentration of pentane or methane equivalent to 25%-50% of full scale concentration. Accuracy must be within -0% to +20% of actual concentration. Accuracy may be corrected by referring to the zero/calibration section of the instruction manual.

The BM 25A is CSA certified according to the Canadian Electrical Code for use in Class I, Division 1 and Class I, Zone 1 Hazardous Locations within an ambient temperature range of -20°C to +55°C. CSA has assessed only the combustible gas detection portion of this instrument for performance according to CSA Standard C22.2 No. 152. applicable only when the instrument is used in the diffusion mode and has been calibrated to 50% LEL CH4.

BM 25A with pump or with PID sensors or with infrared sensors for combustible gases detection <u>is not</u> CSA certified.

I. INTRODUCTION

- **The BM 25A is a portable gas detector** that can be used in explosive gas atmospheres according to directive ATEX 94/9/EC and the IECEx international certification system**.** It provides simultaneous detection of up to 5 gases present in the air by means of sensors specific to each risk to be evaluated (under-oxygenation, explosive or toxic gases).

1. POWER

1.1. Power supply

The BM 25A is powered by an interchangeable and rechargeable battery pack.

Under normal operating conditions, and depending on the sensor configuration, operating runtime varies between a minimum of 75 hours and a maximum of 170 hours (100 hours standard).

The power supply unit is a rechargeable NiMH 7V2 / 9AH battery pack.

1.1.1. Charging the battery pack

A lateral connector allows the battery pack (see the section on CHARGERS) to be charged without dismantling.

1.1.2. Trickle charge

You can trickle charge your BM 25A continuously in a classified area to keep the charge level constant (except in alarm conditions) for as long as needed by means of an intrinsically safe power supply.

1.2. Memory saving

A lithium battery (non-rechargeable) ensures the storage of the BM 25A gas detector's specific data (time/history), especially when the instrument is out of service (off mode) or without the battery pack (main power supply).

This lithium battery has a maximum service life of two years without the main power supply (battery discharged or internal switch in “off” position).

IMPORTANT: The instrument is approved for explosive atmosphere operations, only when it is equipped with batteries of a type recommended by the manufacturer.

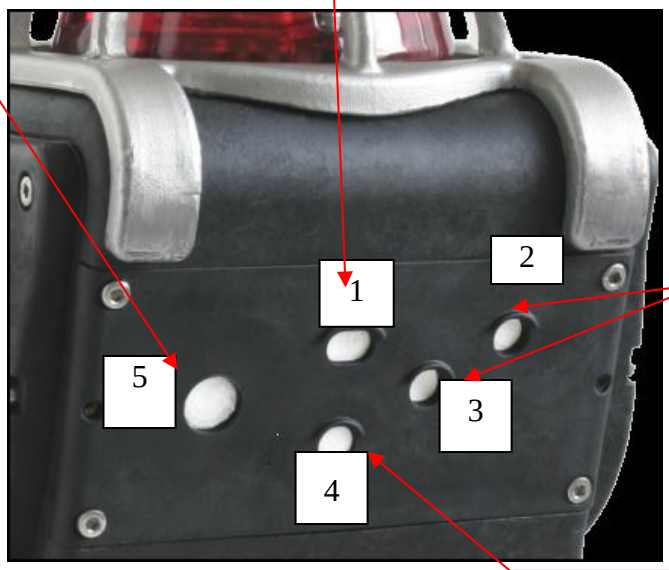
Switch instrument to “off” before any maintenance operation, such as *battery replacement.*

2. SENSORS

2.1. Sensor location (examples)

Sensors S7/S3
- SO2, ETO etc.
- CO2 IR
- Medium O2 sensor (2-year lifetime)

Explosive gas sensor from 0 to 100% LEL.



Small format sensors for toxic gases and oxygen with 1 year service

Medium sensors:
- O2 with 2-year lifetime
- CO/H2S, SO2, ETO etc.
- CO2 IR

1: explo LEL

2: tox/Ox mini

3: tox/Ox mini

4: tox/Ox medium

5: Big sensor (3 series type) or medium

Notes:
- "Big sensors" are "3 or 7 series". As an example: Compensated butane or hydrogen CO sensor
- In case sensors are present in slots 5 and 2, the sensor for slot 5 has priority and deactivates the one for slot 2
- The CO/H2S "combo" sensor shall be placed into slot #4.

<u>Caution</u>: Sensors' slots and protection filters must be kept clean otherwise measurements could be affected.

2.2. Combustible, toxic gases and oxygen sensors

The removable, interchangeable and intelligent sensor blocks are made of catalytic, electrochemical or IR sensor and electronic components, including an “EEPROM” memory in which OLDHAM has stored the sensor's specific characteristics (measuring range, various correction coefficients, STEL and TWA alarms, date of manufacture, serial number, etc.).

Another parameter called the "wear rate" is used by the BM 25A to automatically determine the optimal time to replace the sensor.

These sensor blocks, also called “intelligent blocks,” are plugged in as indicated in Chapter 2.1 above.

Caution: Silicon vapours or other “poisons” may have an adverse effect on explosive gas detection sensors and distort measurements (under-estimated measurements).
If the instrument is used in poisoned atmospheres, calibrate it before its next use.

3. DISPLAY UNIT

This is an LCD type display unit which lights up automatically in backlit mode in alarm or fault conditions and the display can be reversed.

It shows:

- Five measurements for units and type of gas.
- A calibration reminder
- The date and time
- Minimums-maximums
- The mean STEL and TWA values
- The remaining battery time (bar graph)
- Operator identification (roundsman function)
- Maintenance menus
- Alarm transfers

4. VISUAL INDICATIONS

An indicator light (made of 20 ultra-bright LEDs) installed on top of the instrument indicates alarm conditions and can be seen from all directions.

5. AUDIBLE ALARMS

The operator is also warned when an alarm is triggered by two very powerful, built-in horns (103 dB @ 1m).

6. SAMPLING

The BM 25A gas detector can be equipped with an internal electrical pump (not CSA certified) or an external manual pump to measure gas concentrations in inaccessible locations or in locations needing to be verified before access.

6.1. Operating instructions

The operator can:

- Gas detector mode: place the gas detector in the working area and let the BM 25A monitor the atmosphere.
- Sampling mode: take regular measurements by means of a sampling system (manual or electrical).

6.2. Electrical pumping system (not CSA certified)

The BM 25A gas detector can be optionally equipped with an integrated electrical pump, powered directly from the gas detector's battery pack. Pump drainage is between 18 and 25 1/h

NOTE: After each use of the electrical pump, check the watertightness by obstructing the end of the sampling line until the draining alarm is triggered.

6.3. Manual pumping system

It consists of a cover, a horn bulb, a probe and a connecting line.

6.4. Different probes for manual and electrical pump

- Rigid probe
- Semi-rigid probe
- Telescopic probe

CAUTION: Flexible probes, horn bulbs and certain rods are not antistatic. The operator must take the necessary precautions to avoid electrostatic discharges, and, in any event, must prevent any hazardous discharge through a metallic probe.

6.5. Gas detector mode

The BM 25A must be positioned vertically.

Depending on the type of gas to be detected or likely to be present, the instrument must be placed:

- On the ground for detection of heavy gases (density > 1)
- At medium height (approx. 1 m.) or in an outlet nozzle for a general detection of a maximum of gases or for oxygen monitoring.
- Optionally, the gas detector can also be used on a tripod to be more visible from different areas.

7. Communication Software COM 2100

This password-protected software is used to supervise and maintain the BM 25A gas detector:

- Allows the display of gas measurements and grants access to parameters
- Gives diagnostic assistance in case of failure
- Helps programming of instrument and sensor channels
- Allows management of options
- Enables calibration of channels through an automated scrolling menu
- Prints status and monitoring reports
- Enables the management, display and printout of events and measurements stored

The BM 25A can be connected to a computer via a cable equipped with an infrared port.

Two versions are available: COM or USB port.

II. UTILIZATION

1. KEYBOARD

Push buttons are "piezo" type with slight deformation.

They enable:

- Turning the instrument on and off
- The display mode
- The acknowledgment of audible gas alarm
- Backlighting of display (turns off automatically after 4 minutes)
- Scrolling through parameters
- Selecting menus during operation
- Access to the Maintenance level
- Validating (Enter)

2. READING MEASUREMENTS

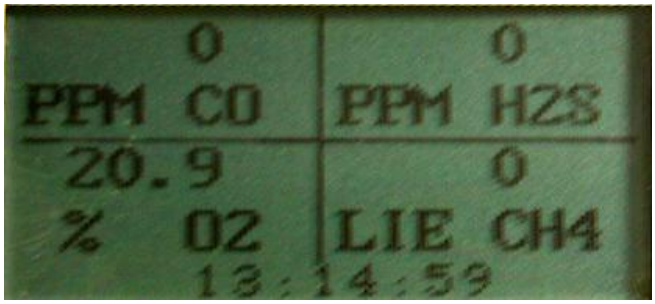
The gas content measured by each of the sensors "in service" can be seen on the alphanumeric display unit.

It is divided into four independent zones, each one corresponding to a sensor channel.
A maximum of four readings can be displayed simultaneously.

In each field, the reading is displayed as follows:

- Measurement
- Unit
- Gas symbol
- In case of a 5-gas configuration, channel 5 is displayed alternately in field 3 of the display unit.

The time is also shown at the bottom of the display unit.



3. STARTING UP

IMPORTANT:
During first start-up, or after a period of inactivity longer than one month, the detector must be charged, then discharged and recharged completely before operation. Additionally, keep in mind that any portable gas detector must be bump tested each day of use.

REMINDER: Before starting up the BM 25A, check that the necessary sensors are connected.

During instrument start up, you have a choice of two procedures:

- Standard procedure used in most cases
- Procedure allowing you to select a reference explosive gas. This procedure is useful when checking for a specific gas (natural gas, butane, etc.).

3.1. Starting up in standard mode

- Briefly press the "On/Off/Enter" key:
- The instrument carries out a visual and audio test phase for a few seconds and indicates:
  - The OLDHAM logo
  - The version of the instrument software, date, code and serial number
  - The pre-programmed values of the alarm thresholds for each sensor channel
  - The current readings

Note: when the instrument is operating, it emits a visual confirmation flash in order to indicate that the BM 25A gas detector is operating correctly. Upon request or by using COM 2100 software, this signal can be cancelled and the interval between each signal can be modified.

3.2. Starting up with choice of reference explosive gas

- Hold down the "Lighting" or "Acknowledge" button
- Switch on the instrument by pressing the “On/Off/Enter” key
- Release both buttons
- The display unit shows the OLDHAM logo for a few seconds while it performs self-tests. It then displays the list of pre-programmed gases, with the currently selected gas in the dark field.

Choosing a new reference gas:

- Each time you press the “Acknowledge” button, the list scrolls downwards and each time you press the “Lighting” button, the list scrolls upwards. Thirty-one reference gases are pre-programmed in the range 0-100% LEL (or 0-5% volume CH4). A thirty-second (32) “Other” lets you select a gas according to your specific requirements. The data specific to that gas is entered in the workshop.
- Accept the choice: when the chosen gas is displayed, press the “Enter” key.

After a testing phase, the explosive reference gas is now the gas that was selected.

If you do not select a gas after a certain amount of time, the gas detector switches to normal phase without changing the reference gas, therefore aborting the procedure.

3.3. Start-up test and calibration due

During start-up, the instrument performs a self-test.

- If tests are incorrect, the instrument switches to “fault” mode (audible signal and continuous visual indication).
- If tests are correct the instrument is ready to use.

CALIBRATION DUE

If, after starting up, the date of calibration has expired, the instrument triggers a calibration due signal on the channel concerned. This calibration due signal can be cancelled and the gas detector is still in use but must be calibrated.

4. SHUTTING DOWN

To shut down, hold down the "On/Off" button for three seconds.

On the display unit, the countdown "Stop 3, 2, 1" is displayed until the instrument is switched off. In more recent gas detector versions, it is necessary to release the ON/OFF button, then press the key again (follow the on-screen instructions).

When the gas detector is switched off, the set values (sensor adjustment data, alarm thresholds, histogram, etc.) are saved.

5. DISPLAY BACKLIGHTING

Measurements can be read in dark places by pressing the "Lighting" button. This lighting is automatically deactivated after 4 minutes.

The display unit backlighting is automatically activated in case of an alarm or fault.

6. SCROLLING THROUGH SET PARAMETERS

When the instrument is in normal operating mode, you can consult a series of data on gas measurements and also the instrument's internal data (remaining battery time, date and time).

While the instrument is in normal operation, press the "Lighting" button repeatedly to scroll through the parameters for each sensor channel

- Display unit backlighting and date
- Measurement location and operator’s name (only with “roundsman” option activated: see Section 6.1)
- Remaining battery time in a bar graph
- Indication of minimums detected by each sensor
- Indication of maximums detected by each sensor
- STEL of each “toxic” channel
- TWA of each “toxic” channel
- Message stating “Enter maintenance code”: to access maintenance menus, specify the four-digit code with the “Acknowledge" and “Lighting” buttons.
- If the code entered is incorrect: return to normal display
- To exit the list before the end: press the “Acknowledge” button.

6.1 "Roundsman" function

If the instrument is equipped with the "Roundsman" function (optional), a list of names can be pre-programmed using the COM 2100 software. This list can be consulted manually via the keypad.

To change the name or location, as follows:

- Current location/name
- Enter
- Scroll down or up through pre-programmed list using the "Acknowledgment" and "Lighting" button
- Enter (to select the new name)
- Acknowledge (to return to normal mode)

6.2 Re-initialization of MIN/MAX

Pushing Acknowledge and Lighting simultaneously restores "min and max" values to the current measurement value. An audible beep confirms the action.

7. ALARMS

The BM 25A is equipped with two types of alarm signals:

- Visual alarms: on the LCD display + red strobe visible from all directions
- Audible alarms: two powerful horns (103 dB @ 1m)

Common LEDs for gas alarms, transfer alarms and faults.

Alarm types:	
Gas alarm 1:	two-tone
Gas alarm 2:	two-tone fast
Transfer alarm:	two-tone slow
Fault:	single-tone

7.1. "Gas" alarms

- Two instant thresholds per channel for Explo, Toxic or Oxygen
- High and low thresholds on oxygen channel (2 optional low thresholds)
- 1 instant threshold on the catharometric channel.
- Exposure limit (STEL) corresponding to a sliding average of measurements over 15 minutes (depending on the country) for each channel equipped with a toxic gas sensor.
- Mean exposure (TWA) corresponding to a sliding average of measurements over eight hours for each channel equipped with a toxic gas sensor.

Hence, as soon as the predefined alarm thresholds are exceeded on at least one channel, the gas detector triggers a pulsed-tone audio and light signal (flashing red light). The alarm message or messages (FAULT, ALARM, TWA, STEL, min., etc.) and the reading value appear on the display unit.

In case of a gas alarm, the gas detector displays the maximum value detected until acknowledgment.

7.2. Fault alarms

Faults can be classified into two categories:

- Faults concerning sensors: out of range, worn sensors, request for calibration in the case of a major deviation during auto-adjustment. These faults generate messages on the display unit, a visual alarm (steady red light) and a steady audible alarm.
- Faults concerning the instrument itself (discharged batteries or electronic fault). The corresponding fault message appears at the bottom of the display unit. It takes priority over all other sensor-related messages.

Examples of information which may be brought to the user's attention:

❖ **Battery pre-alarm warning**

- The remaining battery life is at least 20 minutes. During this phase, measurements are still provided, only the audible beep can be acknowledged.
- **Battery fault**: The BM 25A is no longer measuring, fault is not acknowledgeable.

❖ **"> 100% LEL". LEL sensor Overange.**

This concerns only the combustible channel. When it happens,

- Display is frozen
- It is impossible to acknowledge the audible alarm
- The flashlight switches to the steady mode
- BM 25A powers down the LEL sensor in order to protect it.

- Normal operating conditions can be restored by powering the BM 25A gas monitor down and up (this operation must be performed outside the hazardous area).

❖ **"Out of Range" for toxic gas and oxygen**

- Negative fault (reading below -20% of the scale), acknowledged automatically
- Positive fault (scale exceeded by 120%), must be manually acknowledged

7.3. Gas alarms acknowledgement

7.3.1. Manual acknowledgement

Pressing the "Acknowledge" button stops the audible alarm, but the alarm indicator light flashes until the measurement is lower than the programmed alarm threshold. As soon as the measurement returns within the defined limits, the visual signal is automatically stopped.

In standard configurations, the audible alarm will be reactivated after two minutes if the gas level is still above pre-defined limit(s) (this feature can be disengaged by request).

7.3.2. Automatic acknowledgement

By request, it is possible to automatically stop gas alarms as soon as the concerned gas levels exceed the pre-defined threshold without pressing the "Acknowledge" button.

7.4. Alarm transfer

The BM 25A has two “static” relays; one “gas alarm” relay common (in closing) for all channels and one “failure” relay common in opening for all channels. The alarm relay is configured through COM 2100.

The BM 25A is also equipped with two logic inputs (TOR):

- 1 input dedicated to remote acknowledgment
- 1 input dedicated to alarm triggering

These inputs are also configured through COM 2100.

Several gas detectors can be connected to each other in order to transfer an alarm from one gas detector to another or to manually trigger an alarm.

2 relay outputs (default and gas) and 2 logic inputs (remote acknowledged and alarm transfer)

IMPORTANT: Imperative parameters for relay outputs

AC	I Max 150 mA - V max 30V
DC	I Max 150 mA - V max 30 V

Caution: If the BM 25A gas detector is used in an explosive atmosphere, it is imperative to consider output parameters, since contact must not impair the intrinsic safety of the gas detector. These parameters are mentioned in the Special Instructions section for use in ATEX areas.
OLDHAM shall not, in any event, be liable for failure to follow regulations.

8. MEASUREMENTS

Caution: measurements can be affected by high or low oxygen concentrations. Any reading rapidly changing from too high (exceeding the scale) to too low can in fact indicate a hazardous gas level higher than the measurement scale.

8.1 Display of instantaneous readings

8.1.1. Diffusion mode

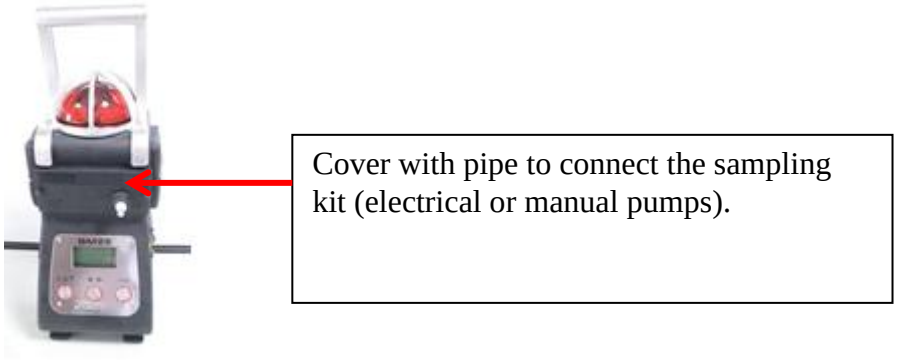
All the instantaneous readings regarding gases are displayed in continuous mode.
The display unit is divided into four separate fields (quadrants).
Therefore, the operator can read:

- The measurement
- The measuring unit preceding the gas symbol

8.1.2 With electric pump systems (the pump is not certified by CSA)

Place the cover on the BM 25A as indicated and wait a few seconds to read measurements. Any anomaly in the pump system is indicated by an audible alarm and on the display unit.

Caution: do not forget to remove the cover to return to diffusion mode.



8.1.3 With manual pump systems

Place the calibration pipe as shown above.
Wait for measurements to stabilize before recording them. They could be over-estimated (explosive gas) or under-estimated (oxygen) during manual pumping due to air movement and system draining.
Caution: do not forget to remove the cover to return to diffusion mode.

8.2 Memorizing histogram measurements

Depending on the version, the BM 25A gas detector can memorize measurements so that they can be restored later on a computer.

The "Histograms" function can be used to output values and events memorized by the BM 25A during its operating period from a computer (a workstation, for example). Resetting of the data contained in the histogram memory can only be performed with a computer. Switching off the gas detector has no effect on memorized data.

8.2.1. Operating principle: memorized items

The BM 25A stores sets of data as soon as it is started, and then in cyclic mode. Each of these sets or threads (with their pre-programmed specifications) has the same structure.

A thread contains:

- Information on measurement channels
- The mean measurements of concentrations on each sensor in operation, over the period of storage intervals (configurable)
- The events on each channel:
  - Resetting
  - Fault
  - Instantaneous or mean alarms
  - Types of maintenance requested (programming, calibration, sensor replacement)
  - Date and time
  - Battery in discharged state
  - Auto-adjustment request
  - Maintenance function request.

8.2.2. Memory capacity

The gas detector can store about 200,000 measurement points.

If the quantity of data to be stored exceeds the gas detector’s storage capacity, the oldest data are lost.

8.2.3. Data storage time

The data stored by the BM 25A are stored for two years if the instrument is no longer in service (turned off or dead battery).

III. Special instructions for use in explosive atmospheres or hazardous locations

Information in following paragraphs must be taken into account and followed by the person responsible for the equipment installation site. Refer to the provisions of European ATEX Directive 1999/92/EC, the Canadian Electrical Code, or to the applicable local legislation, relevant to improving safety protection and health of workers exposed to the risks of explosive atmospheres.

The installation and maintenance of the BM 25A should be performed according to the IEC 60079 - 14 and IEC 60079 – 17 standards, or via an OLDHAM authorized service center.

For intrinsically safe installations and especially for connections to the BM 25A, keep in mind that the person responsible for the IS installation, called "the system designer," must establish a system document demonstrating that the whole system (BM 25A + cable + actuator) is Intrinsically Safe (See standard IEC 60079-25 for the preparation of this document).

ATEX Essential Safety and Health requirements comply with the following standards:
EN 50014 of June 1997 + Amendments 1 and 2
EN 50018 of November 2000 +amendment 1
EN 50020 of June 2002
EN 50284 of January 1999
EN 50303 of July 2000
IEC 60079-0 (Ed 4.0) / EN 60079-0
IEC 60079-1 (Ed 5.0) / EN 60079-1
IEC 60079-11 (Ed 4.0) / EN 60079-11
EN 60079-26

Canadian Electrical Code requirements comply with the following standards:
C22.2 No. 30
C22.2 No. 152
C22.2 No. 157
CAN/CSA-E79-0
CAN/CSA-E79-1
CAN/CSA-E79-11

1. ATEX areas and general rules

The BM 25A can be used in explosive atmospheres in Group II surface industries and Group I mines containing firedamp.

The ambient temperature range for its use is from –20° C to + 55° C.

Depending on the type of sensors used on the instrument, categories covered by the gas detector are:

- Surface industries: Category 2G, use in zones 1 or 2
- Mines containing firedamp: Category M2, use below a gas limit value

The following operations are **prohibited** in explosive atmospheres:

- Opening of the instrument: sensor cover or rear cover
- Recharging of batteries
- Link-up with a computer

All servicing, adjustment and maintenance operations must be performed by duly approved personnel.

In order to avoid any risk of explosion by electrostatic discharges, the display unit glass and indicator light must be cleaned only with a damp cloth. The battery pack must be replaced by the original part specified by the manufacturer – OLDHAM P/N 6311082.

2. ATEX zones: input/output parameters

2.1. Gas detector recharge connector

It is recommended that the charger provided by OLDHAM be used outside of the ATEX area.

When the recharging is done by a charger other than the one provided by OLDHAM, its characteristics must not exceed a voltage of 30 VDC and a current of 30 A.

2.2. Connector for alarm outputs / fault and digital TOR inputs

The characteristics of static relay contacts inputs opto isolated and built into the gas detector are:

U in = 30 V max
I in = 150 mA max

The output characteristics of TOR digital inputs built into the gas detector are:

U out = 5 V max
I out = 50 mA max
L out = 8 mH
C out = 7 µF

Only zero voltage circuits can connect to the digital inputs, i.e. Uin = 0V and Iin = 0A.

Caution: the two previous circuits are separate intrinsic circuits. The cables connected to the ends of these circuits must comply with the requirements for intrinsically safe circuit wiring: type of cables, insulation voltage, insulation, linear capacity and inductance. Refer to national and international standards, for example EN 60079-14.

A system log should be established by the person responsible for the installation as explained above.

2.3. External power connector

External power sources for maintenance of the battery pack must be intrinsic safety power sources and must be compatible with the following input characteristics of the BM 25A:

U in = 30 V I in = 160 mA C in = 0 µF L in = 0 mH

It is possible to connect two external power supplies on the connector in accordance with the rules specified in the previous paragraph.

2.4. Connector accessories / options

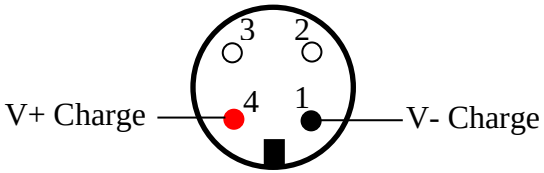
Figure 1 shows the different connection options for the BM 25A. The connectors are located on the sides of the gas detector.

Note: Unused connectors must be equipped with their protective cap.

3. CSA hazardous locations: input/output parameters

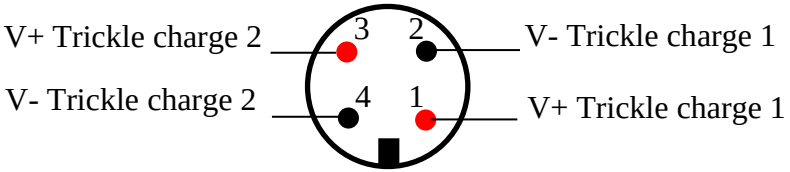
The control drawing shown in Figure 2 defines the CSA approved electrical parameters permitted for the interconnection of the BM 25A to other circuits or apparatus while the instrument is situated in a hazardous location

FIGURE 1: ELECTRICAL REFERENCE FOR BM 25A CONNECTORS



To OLDHAM charger

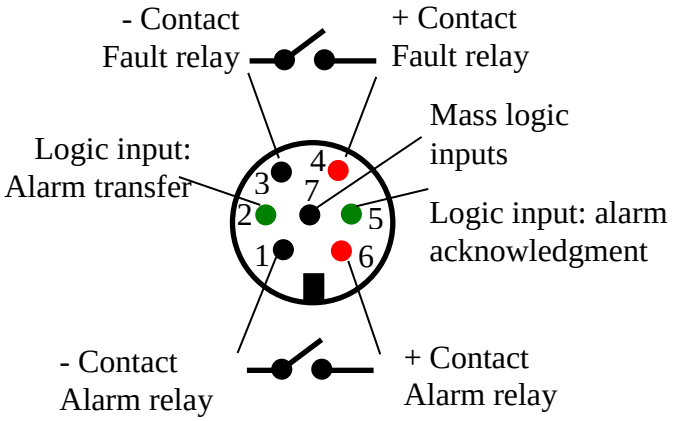
(do not connect in ATEX area)



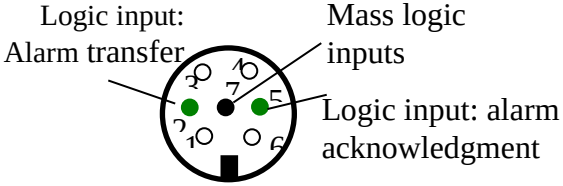
External power supply for trickle charging of BM 25A battery pack

BACK

FRONT



Relay outputs and logic inputs



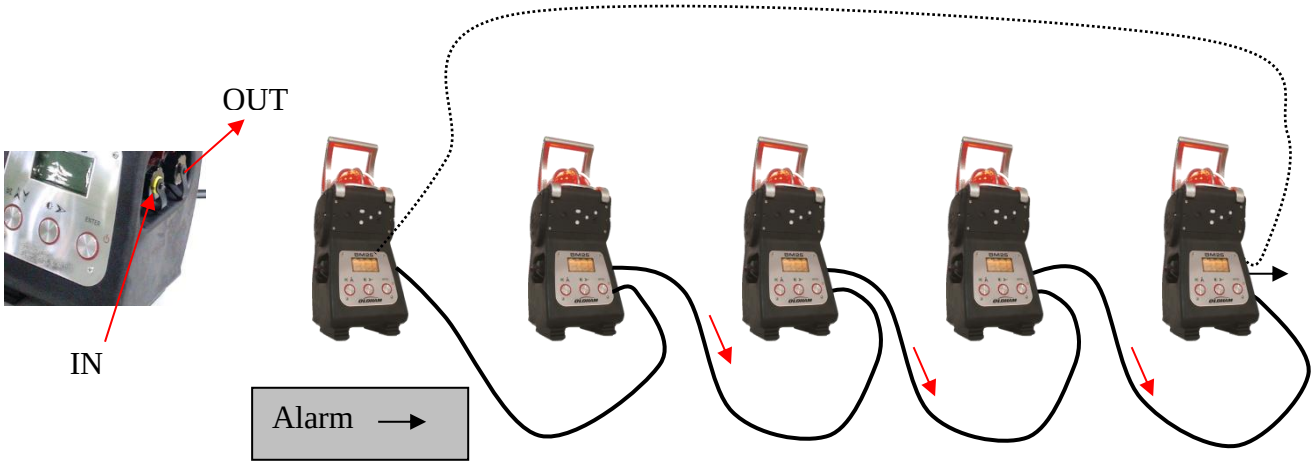
Yellow ring

Option connector = logic inputs

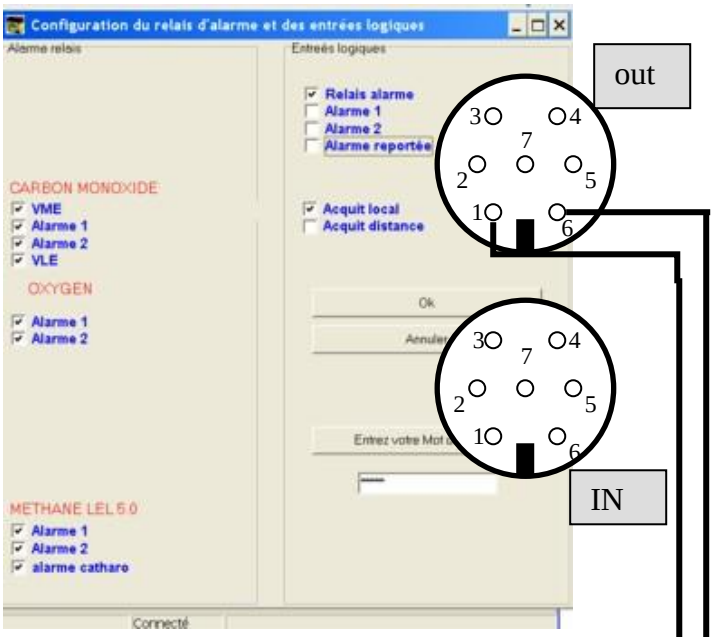
SI Parameters:

- Alarm contact Static type relay Vin=30Vdc, Iin=150 mA, Lin=0 et Cin=0
- External power supply for trickle charging U in =30V, I in=160 mA, Lin=0 et Cin=0
- Logic input U out = 5 V, I out = 50 mA, L out = 8 mH, C out = 7 µF

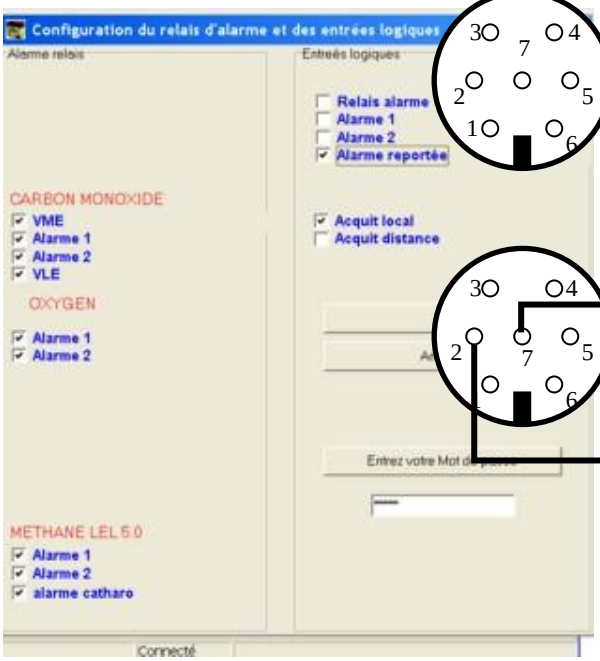
Caution: The responsible person must create an IS system log (see BM 25A note)



Straight-forward alarm transfer



Connection between two BM 25A



Manual call point connection

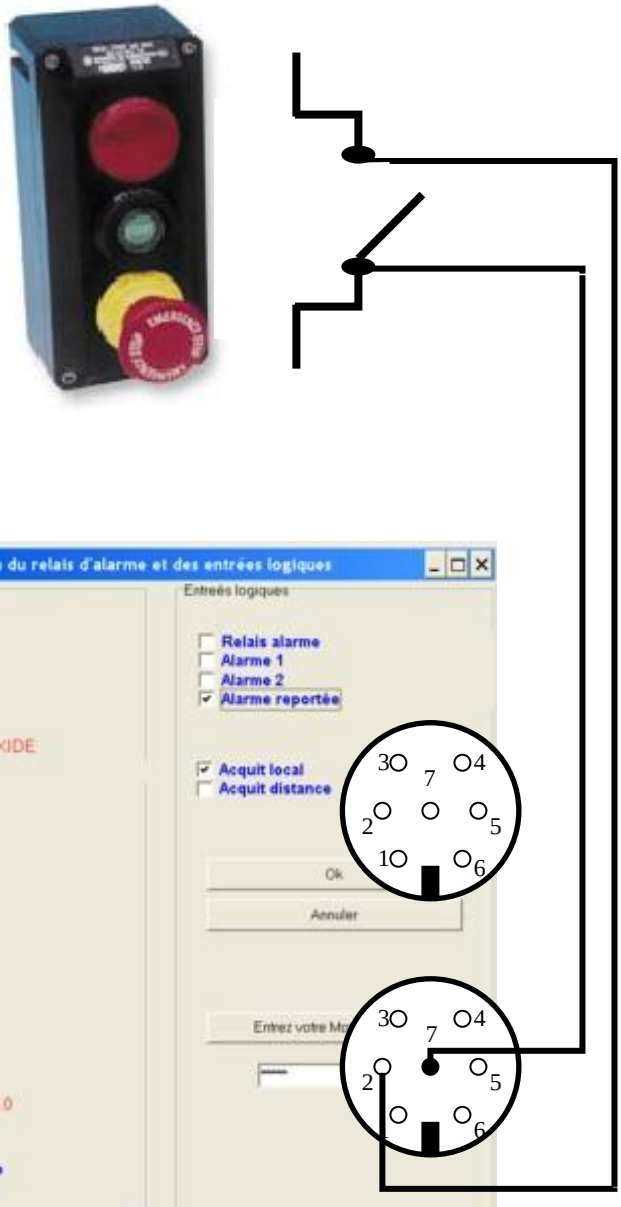
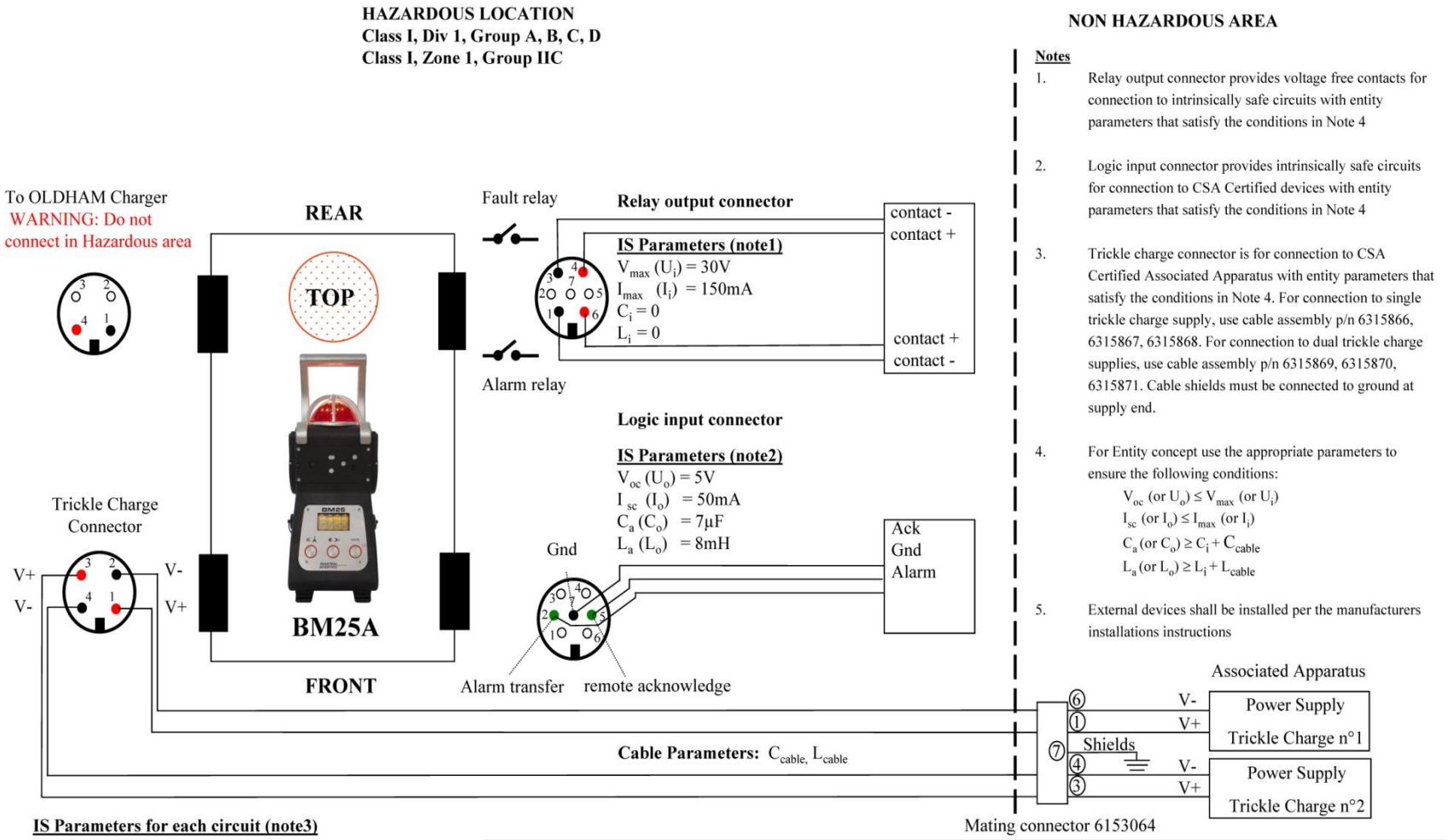


FIGURE 2: CSA Control Drawing for BM 25A Connections



Notes

1. Relay output connector provides voltage free contacts for connection to intrinsically safe circuits with entity parameters that satisfy the conditions in Note 4
2. Logic input connector provides intrinsically safe circuits for connection to CSA Certified devices with entity parameters that satisfy the conditions in Note 4
3. Trickle charge connector is for connection to CSA Certified Associated Apparatus with entity parameters that satisfy the conditions in Note 4. For connection to single trickle charge supply, use cable assembly p/n 6315866, 6315867, 6315868. For connection to dual trickle charge supplies, use cable assembly p/n 6315869, 6315870, 6315871. Cable shields must be connected to ground at supply end.
4. For Entity concept use the appropriate parameters to ensure the following conditions:
   V_{oc} (or U_o) ≤ V_{max} (or U_i)
   I_{sc} (or I_o) ≤ I_{max} (or I_i)
   C_a (or C_o) ≥ C_i + C_{cable}
   L_a (or L_o) ≥ L_i + L_{cable}
5. External devices shall be installed per the manufacturers installations instructions

IS Parameters for each circuit (note3)
V_{max} (U_i) = 30V
I_{max} (I_i) = 160mA
C_i = 0
L_i = 0

Revision	Date	Drawn by	Modifications Details
B	28 Oct 08	Witrant	Add the mating female connector 6153064
A	02 Oct 08	Witrant	First issue

	DATE	NAME	VISA
APPROVED by	28 Oct 08	Witrant	

Drawing Number	Designation
21429G3B	BM25A APPROVAL DRAWING interconnections between intrinsically safe and associated apparatus.

4. Marking

4.4.1 ATEX and IEC Ex

OLDHAM ARRAS
CE 0080
BM 25A
IP66
Ambient T : -20° C +55° C
II 2G / I M2
Ex ia d IIC T4 Ex ia d I

INERIS 05ATEX0044

IECEX INE 06.0002X
Do not open in explosive atmospheres
Potentially hazardous electrostatic charges – see instructions
serial number
manufacture year

4.4.2 CSA

OLDHAM
Model: BM 25A; P/N: 6514872
CSA logo
LR104516
Serial number
Exia intrinsic safety
Ex ia d IIC T4; Class I, Division 1, Group A B C D; T4
C22.2 No. 152

BM 25A with pump or with PID sensors or with infrared sensors for combustible gases detection is not CSA certified.

IV. MAINTENANCE

Gas detectors are above all safety instruments. Recognizing this fact, OLDHAM Corporation recommends that a functional (bump) test be performed on every portable gas detector prior to each use. A functional test involves the injection of a gas of sufficient concentration at the sensor level to trigger pre-set alarms. This test does not, in any event, replace a full calibration of the sensor.

OLDHAM further recommends that a full instrument calibration be performed using a known and certified concentration of calibration gas monthly to ensure accuracy of the instrument.*
If a gas detector does not respond correctly to a gas test, a full calibration with a standard gas is mandatory.

These recommendations are consistent with applicable industry safety protocols and with the standards and directives relative to the safety of industrial sites. Furthermore, OLDHAM is not responsible for procedures implemented on a site.

IMPORTANT: The BM 25As are programmed by the manufacturer for an automatic maintenance check after twelve months if the calibration has not been done ("Calibration due" appears on screen).

The metrological certification of the **BM 25A** by the **CSA** (Canadian Standards Association) according to standard CSA C22.2 No. 152 concerns only the "sensor for detection of explosive gas") CSA No. 152 standard requires calibration of the instrument with a concentration of "methane/CH_4" of 50% LEL, and an operating temperature between 0 and 40°C.

The operations explained in this chapter must be performed by authorized, qualified personnel only as they could adversely affect detection safety.

1. ACCESS TO MAINTENANCE MENUS

With the BM 25A in operation, menus can be accessed in the following manner:

- Scroll to parameters with a central key until a request for a standard access code 0018 is displayed
- Scroll to each digit with the "Lighting" button, choose the figure with the "Acknowledge" button and validate access code with the "Enter" key.

The list of available menus is then displayed:

- Programming
- Calibration
- Auto-zero
- Date and time
- Exit

1.1. Channel settings

This is used to:

- Select the channel to be programmed
- Switch the selected channel On and Off
- Inform the operator of the type of sensor for the measuring range

- In the case of an explosive sensor, select the type of reference gas from 31 pre-selected gases or enter the coefficient of a 32nd gas and program instantaneous thresholds
- When an oxygen sensor is used, to program the “min” and “max” alarm thresholds if this option was selected
- When a toxic gas sensor is used, to program instantaneous thresholds
- When a catharometric sensor is used, to program low instantaneous thresholds

1.1.1. List of pre-programmed “explo" gases and coefficients

The combustible gases sensor used in the BM 25A is a “Wheatstone bridge” sensor type. The coefficients are given for information in relation to a CH_4 scale with LEL = 5.0% (the BM 25A already takes them automatically into consideration during the calibrations / range changes).

Gas	Molecular formula	LEL[1]	LSE[2]	Vapour density	Coef. / CH_4	Suggested gas calibr.	Abbreviation (French)
Acetone	C_3H_6O	2.15%	13%	2.1	1.70	But/Prop	ACO
Acetylene	C_2H_2	1.5%	100%	0.9	1.3	But/Prop	ACY
Butane	C_4H_{10}	1.5%	8.5%	2.0	2.13	But/Prop	BUT
Ethanol	C_2H_6O	3.3%	19.0%	1.6	1.50	But/Prop	ETA
Ethylene	C_2H_4	2.7%	34.0%	0.98	1.30	But/Prop	ETY
L.P.G.	Prop+But	1.65%	~ 9.0%	1.85	1.90	But/Prop	LPG
Natural gas	CH_4	5.0%	15.0%	0.55	1.05	CH_4	GNT
Hexane	C_6H_{14}	1.2%	7.4%	3.0	2.30	But/Prop	HEX
Hydrogen	H_2	4.0%	75.6%	0.069	0.89	But/Prop	H_2
Isopropanol	C_3H_8O	2.15%	13.5%	2.1	1.9	But/Prop	ISP
Methane[3]	CH_4	5.0% 4.4%	15.0%	0.55	1.00 1.14	CH_4	CH_4
Methanol	CH_3OH	5.5%	44.0%	1.1	1.175	But/Prop	MTL
Pentane	C_5H_{12}	1.4%	8.0%	2.5	2.08	But/Prop	PNT
Propane	C_3H_8	2.0%	9.5%	1.6	1.77	But/Prop	PRO
Propylene	C_3H_6	2.0 %	11.7 %	1.5	1.2	But/Prop	PRY
Toluene	C_7H_8	1.2%	7.0%	3.1	2.10	But/Prop	TOL
Xylene	C_8H_{10}	1.0%	7.6%	3.7	2.5	But/Prop	XYL

[1] Lower flammable limit
[2] Upper flammable limit
[3] The LEL adopted value for methane varies by country, there are two different CH_4 ranges (LEL = 4.4% and 5.0% = LEL) to consider.

If the explosive gas that you want to detect is not in the list above, you can use the window "other" by selecting a coefficient given by OLDHAM (contact us).

1.2. Sensor calibration menu

This menu is used to regularly calibrate the sensors connected to the instrument.
Calibration consists of adjusting the zero of the clean air sensor (free of gas which may be detected by the BM 25A) and adjusting sensitivity with a standard gas of known characteristics.
Flow rate of the standard gas rate must be 601/h.

1.3. Auto-zero menu

This menu lets you adjust the "zero" of each sensor used in the BM 25A automatically and simultaneously.
Caution: this menu must be used in clean air only!

1.4. Date and time management menu

This menu is used to update the internal calendar and clock of the gas detector.
These data are used to define time scales, especially when the measurements stored in memory (min., max., STEL and TWA) are printed out or downloaded to an external microcomputer.

Loss of date and time
The electronic circuits for the date and time are supplied with power by a specific lithium battery when the main battery is flat or when the device is switched off.

This lithium battery has an estimated service life of 2 years.

When this battery is low, operator is notified with a "low battery" message before losing all stored data. Battery must then be replaced.

CAUTION: This operation is to be performed by OLDHAM or OLDHAM-approved personnel only.

1.5. Exit menu

To return to normal operating mode.

V. COM 2100 SOFTWARE

COM 2100 software ensures the gas detector's supervision and maintenance:

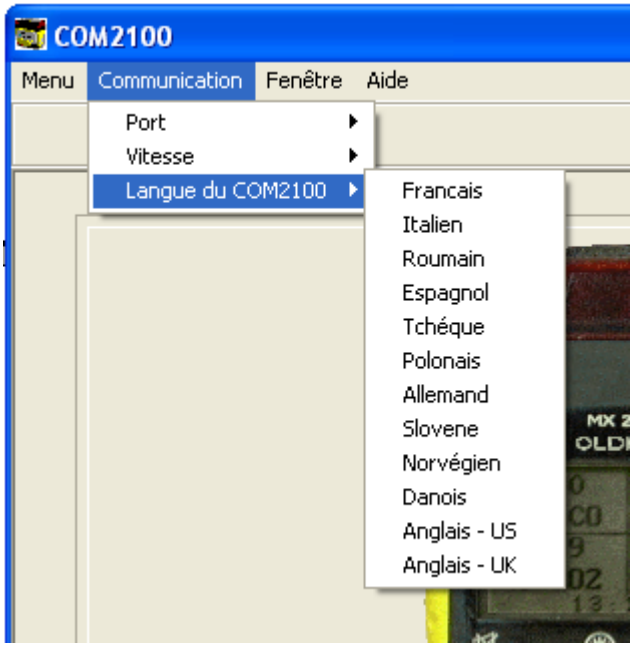
- Display in uncoded mode of readings and parameters on channels
- Gives diagnostic assistance in case of failure
- Helps programming of instrument and sensor channels
- Allows management of options
- Enables calibration of channels through an automated scrolling menu
- Prints status and control reports
- Enables the management, display and printout of events and measurements stored
- Is password protected

The link between the BM 25A and the PC is made by a “COM” or “USB” infrared port adaptor cable.

Opening screen

1. Instrument connection

Note: COM 2100 automatically detects a MX 2100 or BM 25A connection and relevant screens are displayed.

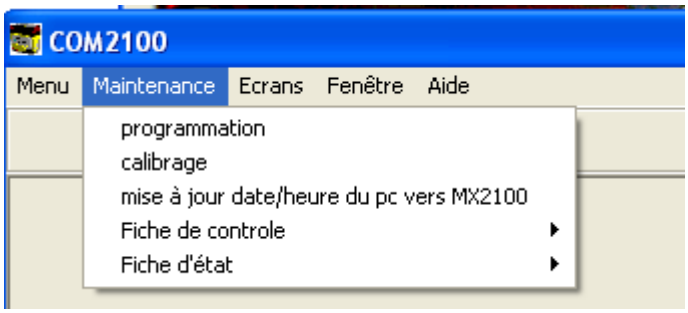


- Program necessary communication parameters (port, speed, language)
- Click on “connect”

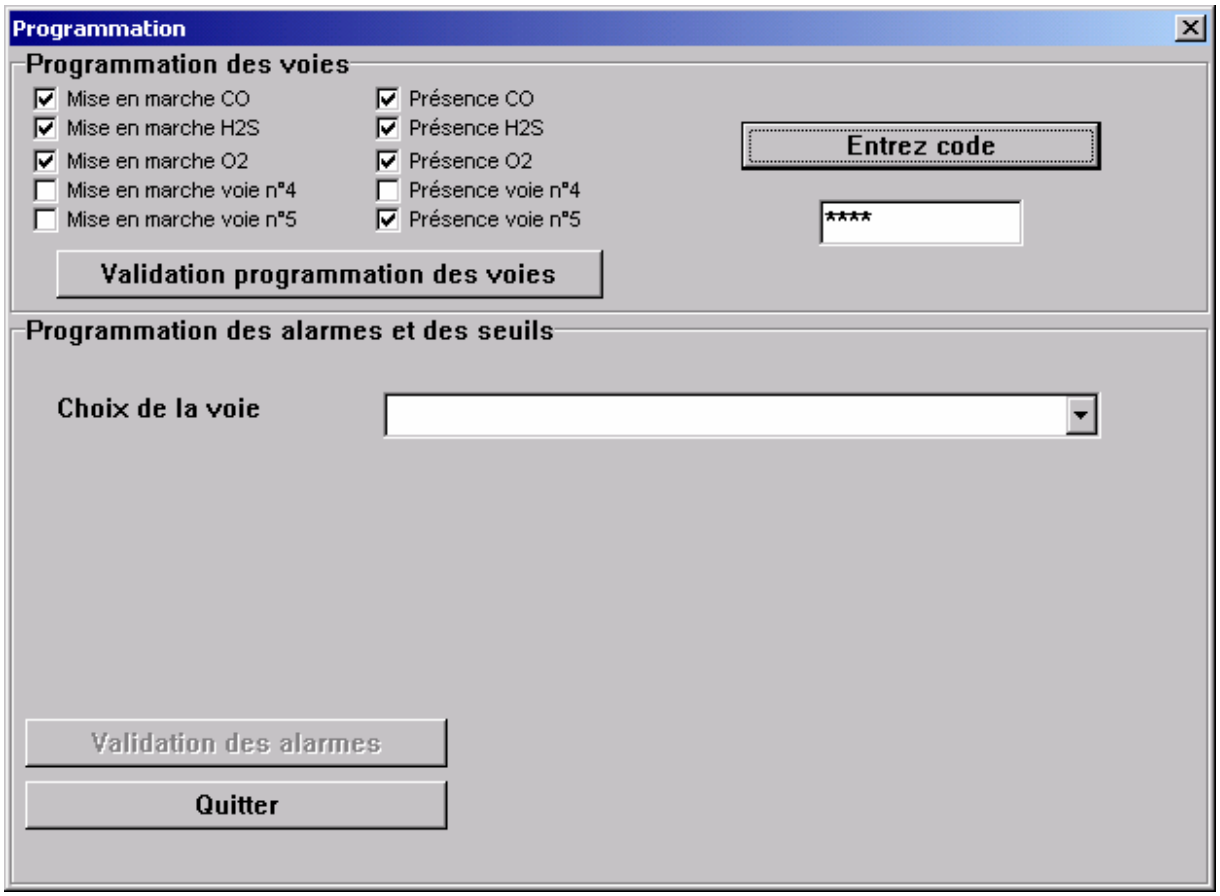
2. Maintenance

"Maintenance" window: access to the menus listed below

The password required to access the different menus is **1000** by default.



2.1.Configuration



2.1.1. Channel settings

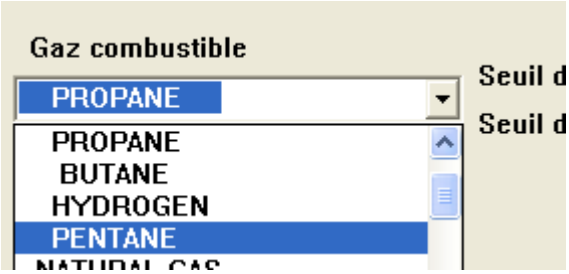
- Access authorized by code. The standard code is 1000.
- Select the desired configuration: the first column “Switching on" (on the upper left) corresponds to activated or inactive measurement channels. The second column “Presence" (on the upper right) corresponds to the presence or absence of sensors on the instrument.
- Then click on “Channel programming validation.”

2.1.2. Alarm settings

- Select the tab choice of channel
- Modify alarm threshold values
- And confirm with “Alarms validation”

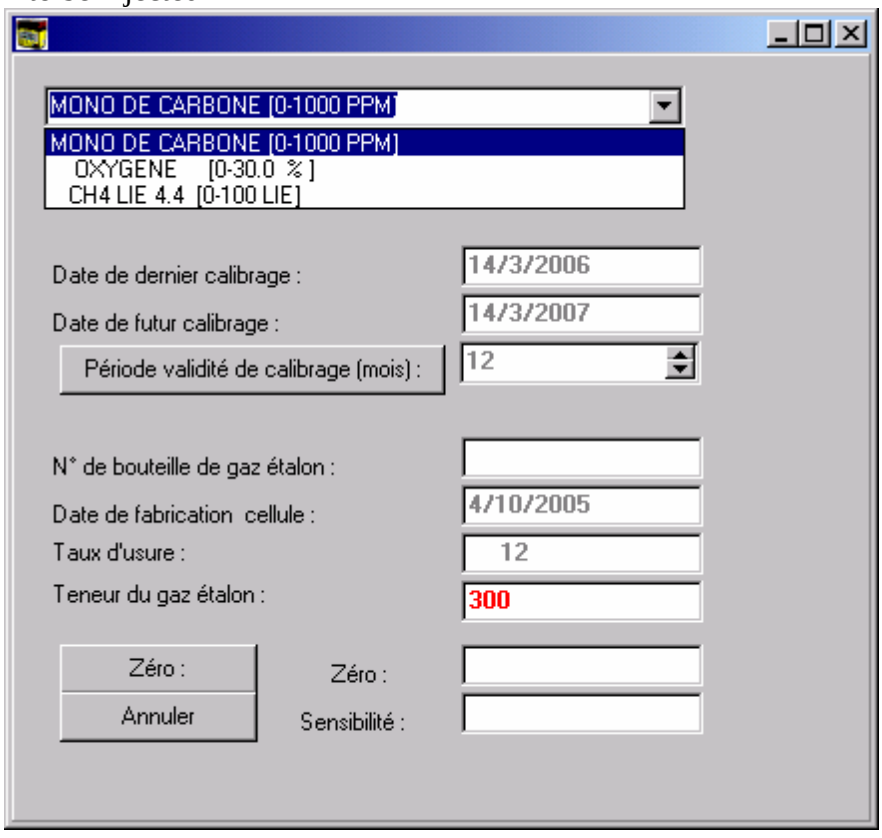
2.1.3. Combustible gas selection

- Authorized access by code
- Change combustible gas name if necessary
- Choose another gas from the list and click on "Programming combustible gas"
- Then click “Quit”

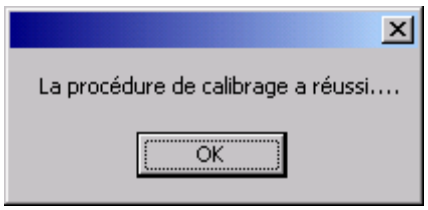


2.2.Calibration

- Choose sensor to calibrate
- Set, if necessary, the maintenance interval
- Indicate the standard gas level used
- Proceed to “zero” as per instructions of software
- Then proceed to sensitivity without forgetting to indicate first (in red) the standard gas level to be injected

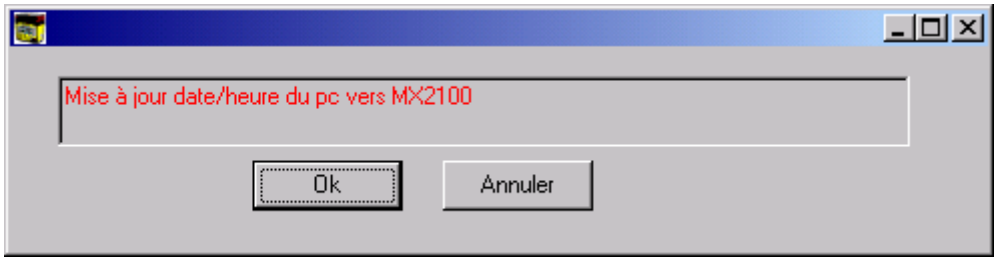


The following messages will appear; if not, start over:



2.3.Time and Date settings

You can update the BM 25A clock directly with the PC clock.

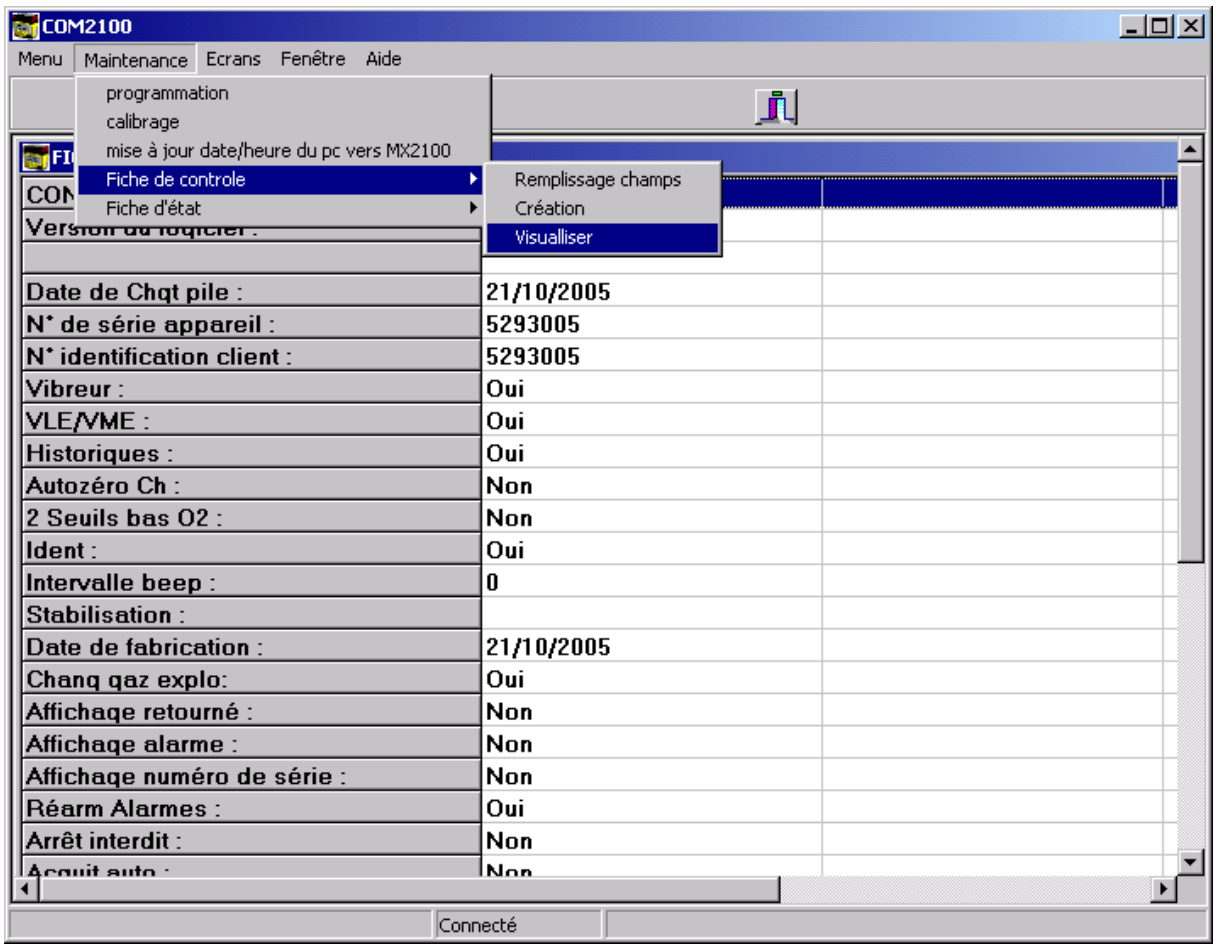


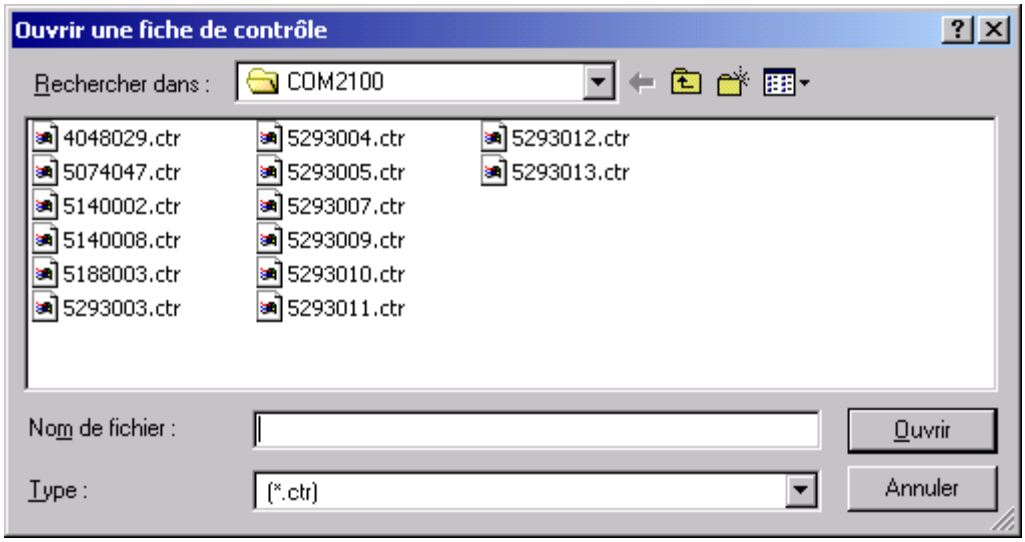
- Click “OK” to validate

2.4.Monitoring reports

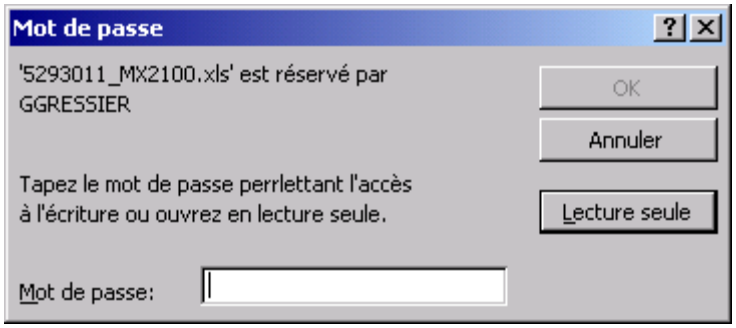
- Fill in the fields (user's information for instance)
- Create the monitoring report (.ctr file)
- Open it from the PC (from COM 2100 folders) to view or print it

Examples:

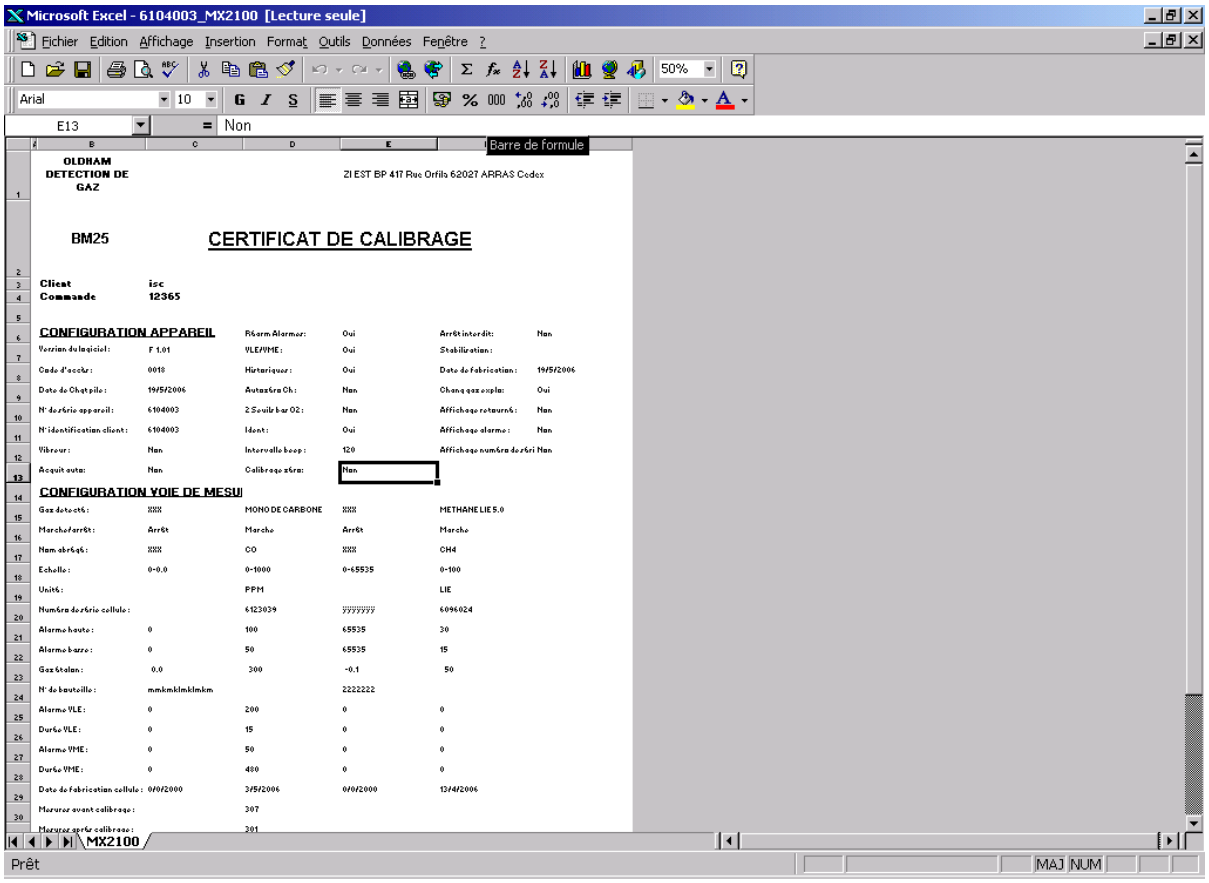




- Click “Read only”


Mot de passe
'5293011_MX2100.xls' est réservé par GGRESSIER
OK
Annuler
Tapez le mot de passe perrlettant l'accès à l'écriture ou ouvrez en lecture seule.
Lecture seule
Mot de passe:

- Printable version of certificate
- It is possible to personalize this document by changing headers for instance (your firm ...)



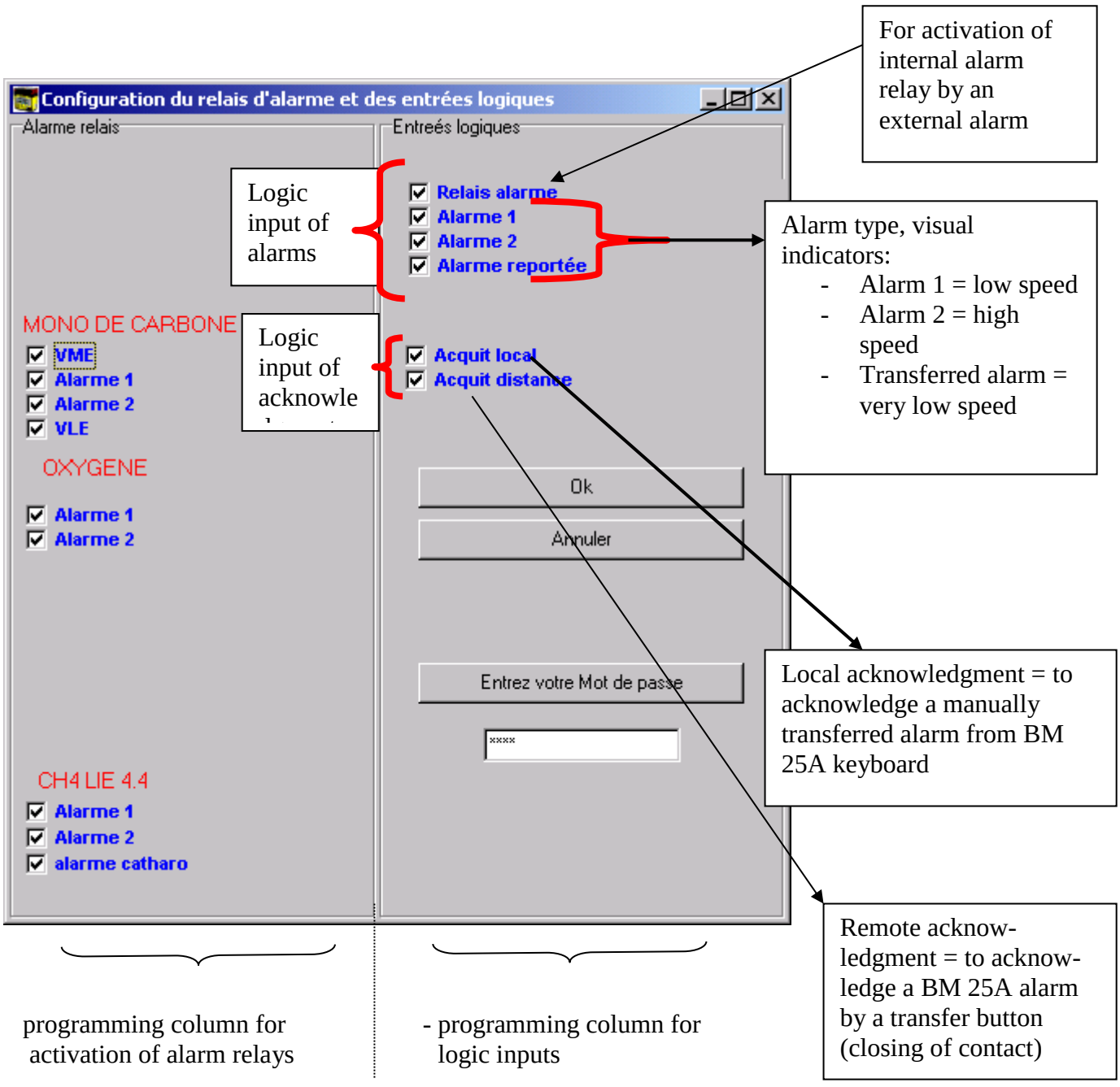
2.5.Status Report

Follow the same procedure as above (.etx files).

3. Configuration of alarm relay and logic inputs for the BM 25A:

- Fill in the table displayed on screen by clicking on the appropriate windows according to alarm relay use and logic inputs needed

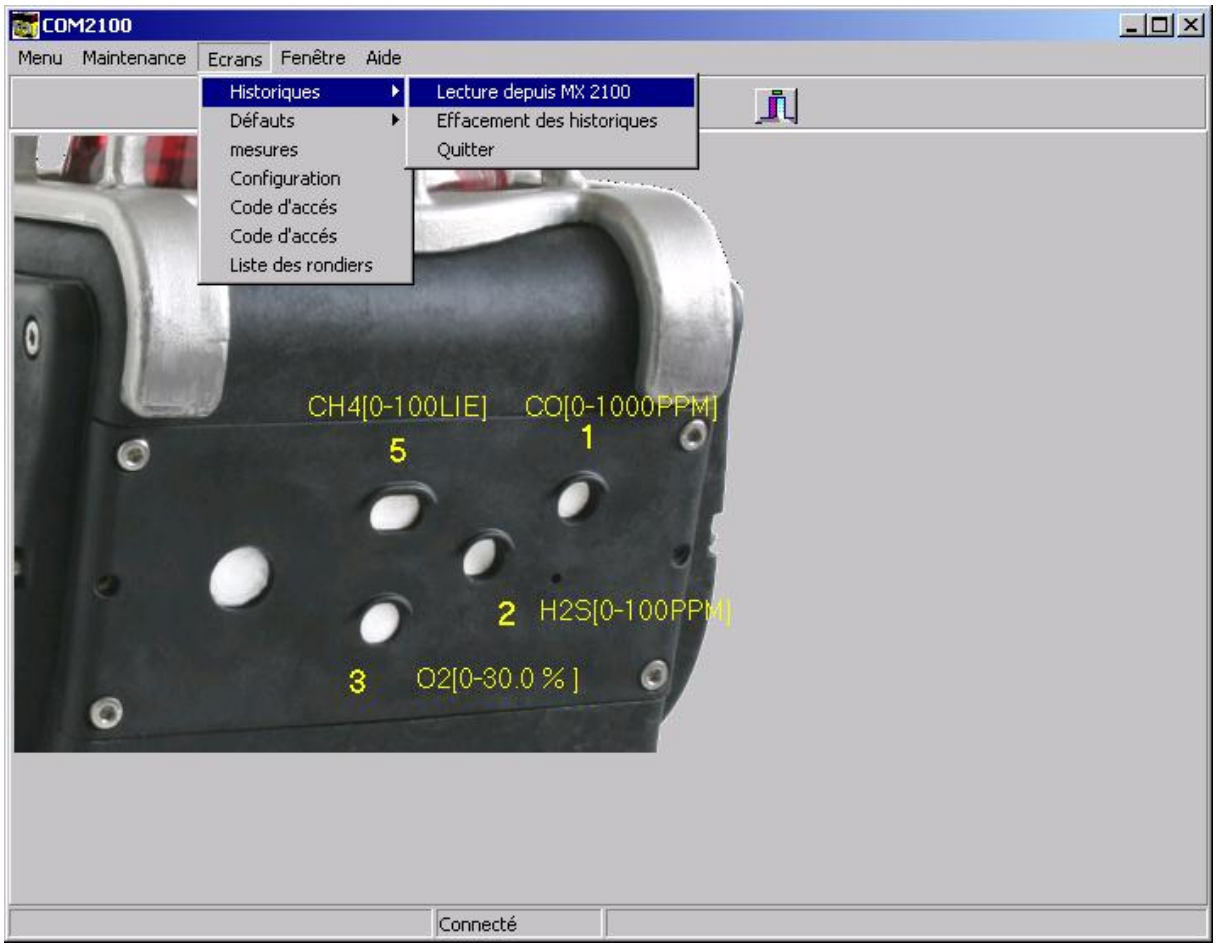
- Click “OK” to validate



- programming column for activation of alarm relays

- programming column for logic inputs

4. SCREENS

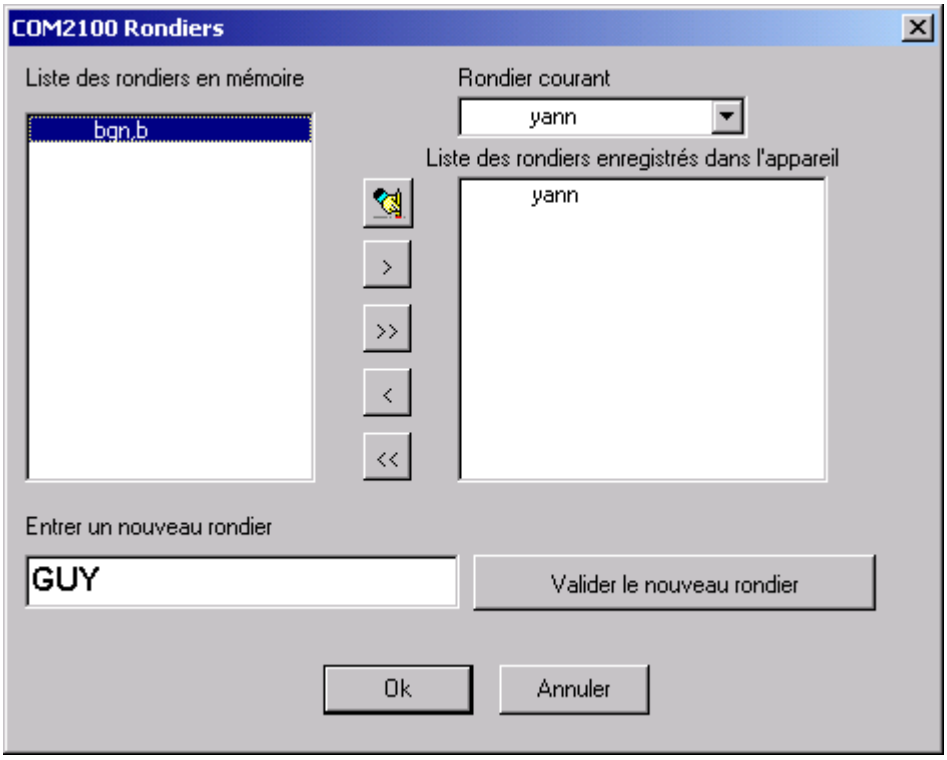


- "Screens" window: displays history, faults, readings and configuration of the instrument at the time of purchase

- The maintenance access code for the BM 25A (**0018** standard) and software access code (**1000** standard) can also be modified

- A **roundsman list** can be created for further use by operators. This provides histograms related to a date/time and a **name** (location or user)

- How to create a name list?



- Write a new name under “Enter new Location/User name”
- Validate by clicking “Save new Location/User name”. It will automatically appear in the “Locations / Users available” box
- Click on the name (in blue)
- In the area on the right titled “Locations / Users list saved in instrument memory” click the right arrow” “>” key. This way, you can navigate names or the full list from left to right and right to left, by using the single or double arrows
- Click “OK” to download the new list to the BM 25A

VI. CHARGERS

1. INTRODUCTION

Integrated and smart charger, 12 VDC to 30 VDC, compatible with vehicle use.

A 100VAC/230VAC adaptor allows recharge from the mains.

Charger connector

2. CHARGING THE BATTERY

Battery charge time is 4 hours and a half.

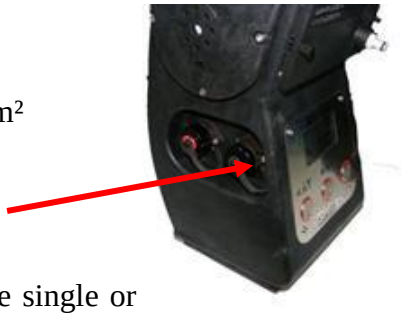
3. TRICKLE CHARGE

3.1. Connection

The BM 25A is supplied with a connector for trickle charge (right next to the charger connector). By means of one or two intrinsic safety power supplies, the battery's charge can be maintained (except in alarm conditions) while leaving the BM 25A in use in a classified area.

Technical characteristics of the IS power supply for trickle charge:

- Io ≤ 160mA
- Pmax= 1.2W
- Maximum resistance of cable=16 ohms
- This means a max. cable length of 500 m to 1.5 mm²



Trickle charge connector

Trickle charge cables with lengths of 25 m, 50 m or 100 m are single or whether the BM 25A is equipped with both explosive and infrared sensors.

CAUTION: ATEX applications – Refer to Section III, Clause 2. Only power supply, p/n 6111303, provided by OLDHAM can be used.

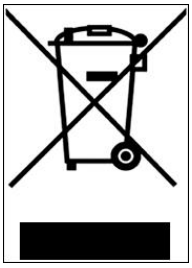
a) For connection to single trickle charge supply, use BLUE INSTRUMENTATION CABLE TYPE 01 IP 09 EGSF.
b) For connection to dual trickle charge supplies, use BLUE INSTRUMENTATION CABLE TYPE 03 IP 05 EISF.

CAUTION: CSA applications – Refer to Section III, Clause 3. The trickle charge connector is for connection to CSA Certified Associated Apparatus with entity parameters that satisfy the conditions of Note 4 in the control drawing (Figure 2).

a) For connection to single trickle charge supply, use cable assembly p/n 6315866, 6315867, or 6315868 and mating connector, p/n 6153064.
b) For connection to dual trickle charge supplies, use cable assembly p/n 6315869, 6315870, or 6315871, and mating connector, p/n 6153064. Cable shields must be connected to ground at the supply end.

VII. DISPOSAL

For the preservation, protection and improvement of environmental quality, and for the protection of human health and the prudent and rational utilization of natural resources, the BM 25A must be disposed of separately from electronic equipment and cannot be disposed of with normal household waste. The user therefore has an obligation to separate the BM 25A from other waste to ensure that it is recycled safely for the environment. For further details on existing collection sites, contact the local administration or seller of the product.



VIII. ACCESSORIES

Part Number	Description
6511154	Charger 220 VAC for BM 25A / Charging time 4 hrs. 30 min.
WCHMUBM	Wall charger for BM 25A
6321390	Support for wall charger BM 25A
WLOG210	Software kit COM 2100 with infrared cord /COM
WLOGUSB	Software kit COM 2100 with infrared cord /USB
6314588	Connection cord IR / USB
6314583	Connection cord IR / COM
6331159	Gas calibration and sampling (manual) pipe
6327920	Sampling kit with rigid pump rod
6327919	Sampling kit with semi-rigid pump rod (not for use in classified areas)
6327918	Sampling kit with telescopic pump rod
6327921	Manual sampling kit with crystal tube (4 m)
6327922	Manual sampling kit with telescopic rod
6327923	Manual sampling kit with semi-rigid rod (not for use in classified areas)
6327924	Manual sampling kit with rigid rod
6321388	Tripod
	Trickle Charge Kits
6311085	Trickle charge kit, single, length: 25m
6311089	Trickle charge kit, single, length: 50m
6311093	Trickle charge kit, single, length: 100m
6311094	Trickle charge kit, dual, length: 25m
6311095	Trickle charge kit, dual, length: 50m
6311096	Trickle charge kit, dual, length: 100m
	Alarm Transfer
6314601	Connector Kit for Alarm Transfer including two connectors (one male and one female)

IX. SPARE PARTS

Part Number	Combustible sensors
6313969	Sensor for Combustible gases, 0-100% LEL
	Medium sensors
6313780	O2 sensor (medium type) (lifetime 2 years)
6313823	COMBO CO / H2S sensor
6313818	CO2 sensor, 0-5% vol.
6313857	NO2 sensor, 30 ppm
6313843	Cl2 sensor, 10 ppm
6313821	ETO sensor, 0-30 ppm
6313819	SO2 sensor, 0-30 ppm
6313822	SO2 sensor, 0-100 ppm
6313841	ClO2 sensor, 0-3 ppm
	Mini Tox / O2 sensors
6313817	O2 sensor (lifetime 1 year minimum)
6313787	CO sensor, 0-1000 ppm
6313826	CO sensor, 0-2000 ppm
6313788	H2S sensor, 0-100 ppm
6313816	H2S sensor, 0-30 ppm, special for hydrocarbons
6313799	NH3 sensor, 0100 ppm
6313800	NH3 sensor, 0-1000 ppm
6313801	NO2 sensor, 0-30 ppm
6313802	NO sensor, 0-300 ppm
6313803	H2 sensor, 0-2000 ppm
6313804	HCl sensor, 0-30.0 ppm
6313805	HCN sensor, 0-30.0 ppm
6313806	HF sensor, 0-10 ppm
6313807	O3 (ozone) sensor, 0-1 ppm
6313808	SIH4 (silane) sensor, 0-50 ppm
6313809	Cl2 sensor, 0-10.0 ppm
6313810	PH3 (phosphine) sensor, 0-1 ppm
6313811	AsH3 (arsine) sensor, 0-1 ppm
6313812	COCl2 (phosgene), 0-1 ppm
6313820	F2 sensor, 0-1 ppm
6313879	N2H4 sensor, 0-1ppm
	5th Position (not CSA certified)
6313998	PID isobutylene sensor
6314065	CH4 IR sensor, 0-100% LEL (4.4% vol)
6314064	CH4 IR sensor, 0-100% LEL (5.0% vol)
6314087	C3H8 IR sensor, 0-100% LEL
6314088	C4H10 IR sensor, 0-100% LEL
6314089	Isobutane IR sensor, 0-100% LEL
6314090	LPG IR sensor, 0-100% LEL
6314092	CH4 IR sensor, 0-100% vol

Note: This list is not exhaustive and may be modified.
Sensors must be stored in a cool place (5°C).

Part Number	Combustible sensors
6313832	Batch of fake TOX/O2/COMB sensors
6111303	IS power supply only
6153027	connector for IS power cable

X. TECHNICAL CHARACTERISTICS

1. DESCRIPTION

Manufacturer**: OLDHAM**

Function: **Multi-risk gas detector**

Type**:** **BM 25A**

Configuration:

- One to four sensors (explosive, electrochemical, infrared (CO2))

Gases detected:

- Explosive gases, toxic gases and oxygen

Measurement:

- Continuous on all sensors in operation

Sensors:

- Intelligent, precalibrated, interchangeable units
- Automatic recognition by the BM 25A by means of EEPROM

Display unit:

- Graphic LCD
- Messages in uncoded mode, with backlighting
- “Flip-Flop” function

Display lighting:

- With time switch upon request, automatic for alarm or fault

Sensor faults

- Indication by indicator light
- Message in uncoded mode
- Corresponding display "frozen". Other channels operational
- Continuous general audible and visual alarm

Battery fault:

- Display in uncoded mode
- Continuous general audible and visual alarm

Operating check:

- Self-test on power-up
- Visual signal every 2 minutes (factory)
- Display of measured values in uncoded mode

Alarm thresholds:

- LEL: 2 adjustable instantaneous thresholds in 0-60 % LEL range
- Oxygen: two adjustable instantaneous thresholds over the sensor's whole measuring scale (over-oxygenation and under-oxygenation) or two optional under-oxygenation thresholds

- Toxic (by sensor): two adjustable instantaneous thresholds over the whole range
  - One TWA threshold
  - One STEL threshold

Alarm sig nals:

- General audible and visual alarm (display unit, indicator light)
- Display in uncoded mode of the fault or alarm for the channel concerned

Inputs/Outputs:

- RS232 link by infrared
- On PC, maintenance and supervision software, EXCEL database
- Alarm relay output
- Fault relay output
- One logic input for alarm trigger
- One logic output for remote acknowledgment

Ancillary software packages:

- Maintenance software COM 2100

Power supply:

- NiMH rechargeable battery pack

Battery life (except in alarm conditions):

- 70 hours with 1 catalytic and CO2 sensors
- 100 hours with 1 catalytic + Tox sensors
- 170 hours with Tox sensors only

Charging time:

- 4 hours 30 minutes

Ingress Protection:

- IP66 certified by Notified Body (INERIS)

Weight:

- 6.85kg

Dimensions:

- H470 x L180 x P190 mm

Electromagnetic Compatibility:

- compliant with standard EN 50270 according to Electromagnetic Compatibility Directive 89/336/EEC

2. SENSORS (non-exhaustive list)

	Explosive gases	Oxygen O_2 2 years	Oxygen O_2 1 year	Carbon dioxide CO_2	Carbon monoxide CO	Hydrogen sulphide H_2S
Sensor reference	6 313 969	6 313 780	6 313 817	6 313 818	6 313 787	6 313 788
Standard range (1)	0 - 100% LEL	2 - 30% volume	2 – 30% volume	0 - 5% v/v	1000	100
Measurement principle	Thermo-catalytic 4L	Electrochemical	Electrochemical	Infrared absorption	Electrochemical	Electrochemical
Display resolution (1)	1 % LEL	0.1% v/v	0.1% v/v	0.1% v/v	1	1
Accuracy (2)	2	0.3% v/v	0.3% v/v	0.2% v/v	15	3
Repeatability (3)	± 1 % LEL	0.1% v/v	0.1% v/v	0.1% v/v	1	1
Deviation of zero/sensitivity (4)	0,5% / 2,5% from monthly reading	0.2 / 2	0.2 / 2	0.2 / 2	0.5 / 1.5	0.5 / 2.5
Response time (5) (sec)	< 20 seconds	< 10	< 10	< 30	< 30	< 25
Temperature (6)	-20°C to +50°C	-20°C to +40°C	-20°C to +40°C	-10°C to +40°C	-20°C to +40°C	-20°C to +40°C
Relative humidity and pressure range (7)	0 – 95 % RH without condensation 1 bar ± 20 %	10 – 95 % RH 1 bar ± 20 %	10 – 95 % RH 1 bar ± 20 %	10 – 95 % RH 1 bar ± 20 %	10 – 95 % RH 1 bar ± 20 %	10 – 95 % RH 1 bar ± 20 %
Service life (8)	48 months	28 months	16 months	60 months	36 months	36 months
Storage conditions and maximum storage time (9)	-40°C to +40 °C 10%< HR< 60 % protected from air 1 bar ± 10 % 6 months maximum	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 3 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 3 months	0 – 40 °C 10 – 60 % RH 1 bar ± 20 % 6 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months
Response time (10)	<30 s	Sensors functional immediately after start up of device		120 s	Sensors functional immediately after start up of device	
Notes:	- Measurement is underestimated if oxygen level is < 10% - Exposure to high levels of silicon or sulphur vapors may damage the detector. - The detector is sensitive to a majority of explosive gases	- Presence of high levels of CO_2 can lead to an over estimation of O_2 concentration			- Exposure to high levels of organic solvents can damage the sensors - Exposure to gases at higher levels than detector's range can damage it. Recalibrate sensors if they go out of range	

Table No. 2

	Chlorine $C1_2$	Hydrochloride acid HCl	Hydrocyanic acid HCN	Ammonia NH_3	Ammonia NH_3	Nitric oxide NO	Nitrogen dioxide NO_2	Sulphur Dioxide SO_2
Reference	6 313 809	6 313 804	6 313 805	6 313 799	6 313 800	6 313 802	6 313 801	6 313 819
Standard range (1)	10	30	10	100	1000	300	30	30
Measurement principle	Electrochemical	Electrochemical	Electrochemical	Electrochemical	Electrochemical	Electrochemical	Electrochemical	Electrochemical
Display resolution (1)	0.1	0.1	0.1	1	1	1	1	1
Accuracy (2)	0.25	1	0.25	5	30	10	1	1
Repeatability (3)	2	2	2	2	2	1	1	1
Deviation of zero/sensitivity (4)	0.5 / 5	0.5 / 5	0.5 / 5	1 / 2	1 / 2	0.5 / 3	0.5 / 5	0.5 / 2
Response time (5)	< 60	< 80	< 60	< 60	< 60	< 30	< 30	< 60
Temperature (6)	-20 to +40	-20 to +40	-20 to +40	-20 to +40	-20 to +40	-15 to +40	-20 to +40	-20 to +50
Relative humidity and pressure range (7)	10 – 90 % RH 1 bar ± 20 %	15 – 95 % RH 1 bar ± 20 %	15 – 95 % RH 1 bar ± 20 %	15 – 90 % RH 1 bar ± 10 %	15 – 90 % RH 1 bar ± 10 %	20 – 90 % RH 1 bar ± 20 %	15 – 90 % RH 1 bar ± 20 %	15 – 90 % RH 1 bar ± 10 %
Service life (8)	30	24	24	24	24	30	40	30
Storage conditions (9)	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months	4 – 20 °C 10 – 60 % RH 1 bar ± 10 % 2 months
Warm-up time (10)	Sensors functional immediately after start up of device							
Notes:	- Exposure to high levels of organic solvents can damage the sensors - Exposure to gases at higher levels than detector's range can damage it. Recalibrate sensors if they go out of range							

1 - In ppm unless otherwise specified
2 - At 50% of scale (same unit as range)
2 - As % of signal read unless otherwise specified
4 - Nominative values in normal use conditions per month as % of scale for zero and as % of measurement for sensitivity
5 - In seconds at 90% of final value
6 - In °C
7 - Without condensation
8 - Average noted per month 12 month guarantee
9- All sensors must be protected from air when stored
10- Time from start-up for optimal performance of sensor

XI. EC DECLARATION OF CONFORMITY

Déclaration de Conformité CE
EC Declaration of Conformity

La **Société Industrial Scientific Oldham**, ZI Est 62000 Arras France, atteste que la :
The ***Company*** **Industrial Scientific Oldham**, *ZI Est 62000 Arras France, declares that:*

Détecteur de gaz BM 25(A)
Gas detector BM 25(A)

est conforme aux exigences des Directives Européennes suivantes:
complies with the requirements of the following European Directives:

I) Directive Européenne ATEX 94/9/CE du 23/03/94**: Atmosphères Explosives**
The European Directive ATEX 94/9/CE of 23/03/9: Explosive Atmospheres

Normes harmonisées appliquées : *Harmonised applied standards*	**EN 60079 -0**:09 Protection du matériel-règles générales *Equipment protection-general requirements* **EN 60079-1**:07(„d") / **EN 60079-11**:07 („i") **EN 60079-26**:07 („Ga") / **EN 50303**:00 („M")
Catégorie *(Category)*/Marquage *(marking)*	
Détecteur sans bloc cellule IR : *Detector without IR module*	
BM 25	**II 1G / I M1** **Ex ia IIC T4 Ga / Ex ia I Ma**
BM 25A	**II 2G / I M1** **Ex ia d IIC T4 Gb / Ex ia I Ma**
Détecteur avec bloc cellule IR: *Detector with IR module*	
BM 25(A)	**II 2G / I M2** **Ex ia d IIC T4 Gb / Ex d ia I Mb**
Attestation CE de Type du matériel *EC type examination certificate*	**INERIS 05 ATEX 0044**
Notification Assurance Qualité de Production *Notification of the Production QA*	**INERIS 00 ATEX Q403**
Délivré par l' Organisme notifié numéro 0080 *Issued by the Notified Body n°0080*	**INERIS**, Parc Alata 60550 Verneuil en Halatte France

II) Directive Européenne CEM 2004/108/CE du 15/12/04 **: Compatibilité Electromagnétique**
The European Directive EMC 2004/108/CEE of 15/12/04: ELECTROMAGNETIC COMPATIBILITY

Normes harmonisées appliquées : *Harmonised applied standards*	**EN 50270 :**06 for type2 CEM-Appareils de détection des gaz *EMC- apparatus for the detection of gases*

Arras, le 07/05/13

ISO 9001:2008 CERTIFIÉ
ISO 14001:2004 CERTIFIÉ

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Michael Mobley
Certification Project Engineer/ATEX Authorized Person

CE-Muster-Oldham - detector-RI

The Fixed Gas Detection People

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